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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/797,537

03/11/2004

Rajesh S. Nair

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7590

01/26/2006

EXAMINER

ROSE, KIESHA L

Mr. Jerry Chroma  
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ART UNIT

PAPER NUMBER

2822

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/797,537	<b>Applicant(s)</b> NAIR ET AL.	
	<b>Examiner</b> Kiesha L. Rose	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

This Office Action is in response to the amendment filed 7 September 2005.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 11 discloses a diffused drain extension region of the second conductivity type formed in a portion of the region of semiconductor material and extending from the major surface, and a region of the first conductivity type formed within a portion of the diffused drain extension region. It is unclear what the region is and how it is formed in the portion of the diffused drain extension region.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2822

Claims 1-6,8-10 and 12-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tihanyi (U.S. Patent 6,507,071) in view of Disney (U.S. Patent 6,509,220).

Tihanyi discloses a semiconductor device (Fig. 2) that contains a semiconductor substrate (1) having a first conductivity type, a region of semiconductor material (2) comprising alternating layers (3/4) of first and second conductivity type material formed overlying the semiconductor substrate and having a major surface, the region of semiconductor material further including a top layer of the first conductivity type formed adjacent the first major surface and one of the alternating layers of the second conductivity type formed adjacent and below the top layer, a drain region (9) of the second conductivity type extending from the first major surface into at least a portion of the region of semiconductor material, a trench gate structure (14) formed in a portion of the region of semiconductor material and adjoining the alternating layers, wherein the trench gate structure control a sub-surface channel region, the drain region comprises a trench (9) filled with a doped polycrystalline material, the trench gate is filled with doped polycrystalline material of a second conductivity type and wherein the trench gate structure extends from the major surface, has a first gate dielectric layer (12) formed at the sidewall surface of the trench gate structure, a lower portion of the trench gate structure terminates within the substrate, the top layer is thicker than adjacent layers in the region of the semiconductor material and a portion of the alternating layers within the region of semiconductor material extend between the trench drain structure and the trench gate structure. Tihanyi discloses all the limitations except for a body and a

Art Unit: 2822

source region. Whereas Disney discloses an IGFET (Figs. 5 and 6) that contains a substrate (20), a semiconductor region (10/15) with alternating layers with a top layer, a drain region (47), a body region (40) of first conductivity type formed in a portion of the region of semiconductor material and extending from the major surface of the semiconductor material and partially into the top layer, a first source region (42) formed in the body, a trench gate structure (63) formed in a portion of the semiconductor material, the drain region has a trench (67) filled with polycrystalline material, the trench gate structure is filled with doped polycrystalline material of second conductivity and wherein the trench extends from the major surface adjacent the source and a portion of the body region into the region of semiconductor material and has a first gate dielectric (64) formed on the sidewalls of the trench gate structure, a first doped region (41) of second conductivity type and formed adjacent the sidewall of the alternating layers, a surface gate structure including a gate dielectric layer (44) overlying the first major surface and a gate electrode layer (43) overlying the gate dielectric, wherein the surface gate controls the conduction of the surface channel region, a diffused drain extension region (71) of second conductivity formed in the top layer and between the body region and the drain region and the trench gate structure extends further into the semiconductor material than the trench drain structure. The body and source region were formed in the device to improve breakdown voltage of the transistor caused by the alternating layers in the region of semiconductor material. (Column 7, lines 48-60)

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Tihanyi by incorporating a body region

Art Unit: 2822

and source region to improve breakdown voltage of the transistor caused by the alternating layers in the region of semiconductor material as taught by Disney.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-6 and 8-21 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

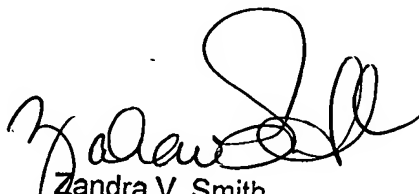
Art Unit: 2822

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiesha L. Rose whose telephone number is 571-272-1844. The examiner can normally be reached on T-F 8:30-6:00 off Mondays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on 571-272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KR  
KLR

  
Zandra V. Smith  
Supervisory Patent Examiner  
23 Jan 2006